

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: YOSHIDA, Hiroshi et al. Conf.:
Appl. No.: NEW Group:
Filed: December 5, 2001 Examiner:
For: POLYMER GEL ELECTROLYTE, SECONDARY CELL,
AND ELECTRICAL DOUBLE-LAYER CAPACITOR

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, DC 20231

December 5, 2001

Sir:

The following preliminary amendments and remarks are respectfully submitted in connection with the above-identified application.

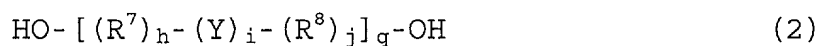
IN THE CLAIMS:

Please amend the claims as follows:

5. (Amended) The polymer gel electrolyte of claim 1, wherein the matrix polymer is an unsaturated polyurethane compound prepared by reacting:

(A) an unsaturated alcohol having at least one (meth)acryloyl group and a hydroxyl group on the molecule;

(B) a polyol compound of general formula (2) below



wherein R^7 and R^8 are each independently a divalent hydrocarbon group of 1 to 10 carbons which may contain an amino, nitro, carbonyl or ether group,

Y is $-\text{COO}-$, $-\text{OCOO}-$, $-\text{NR}^9\text{CO}-$ (R^9 being hydrogen or an alkyl group of 1 to 4 carbons), $-\text{O}-$ or an arylene group,

the letters h , i and j are each independently 0 or an integer from 1 to 10, and

the letter q is a number which is ≥ 1 ;

(C) a polyisocyanate compound; and

(D) an optional chain extender.

6. (Amended) The polymer gel electrolyte of claim 1, wherein the matrix polymer is a polymeric material having an interpenetrating network structure or a semi-interpenetrating network structure.

8. (Amended) The polymer gel electrolyte of claim 1, wherein the matrix polymer is a thermoplastic resin containing units of general formula (3) below



in which the letter r is an integer from 3 to 5, and the letter s is an integer ≥ 5 .

9. (Amended) The polymer gel electrolyte of claim 1, wherein the matrix polymer is a fluoropolymer material.

10. (Amended) The polymer gel electrolyte of claim 1, wherein the electrolyte salt is at least one selected from the group consisting of alkali metal salts, quaternary ammonium salts, quaternary phosphonium salts and transition metal salts.

11. (Amended) A secondary cell comprising a positive electrode, a negative electrode and an electrolyte, wherein the electrolyte is a polymer gel electrolyte according to claim 1.

14. (Amended) An electrical double-layer capacitor comprising a pair of polarizable electrodes and an electrolyte between the polarizable electrodes, wherein the electrolyte is a polymer gel electrolyte according to claim 1.

REMARKS

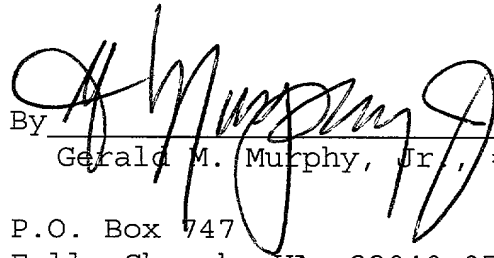
The amendment to the claims is merely to delete improper multiple dependencies and to place the application into better form for examination. Entry of the present amendment and favorable action on the above-identified application are earnestly solicited.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachments

(Rev. 09/27/01)

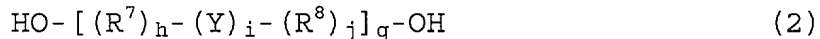
VERSION WITH MARKINGS TO SHOW CHANGES MADE

The claims have been amended as follows:

5. (Amended) The polymer gel electrolyte of [any one of claims 1 to 4]claim 1, wherein the matrix polymer is an unsaturated polyurethane compound prepared by reacting:

(A) an unsaturated alcohol having at least one (meth)acryloyl group and a hydroxyl group on the molecule;

(B) a polyol compound of general formula (2) below



wherein R⁷ and R⁸ are each independently a divalent hydrocarbon group of 1 to 10 carbons which may contain an amino, nitro, carbonyl or ether group,

Y is -COO-, -OCOO-, -NR⁹CO- (R⁹ being hydrogen or an alkyl group of 1 to 4 carbons), -O- or an arylene group,

the letters h , i and j are each independently 0 or an integer from 1 to 10, and

the letter q is a number which is ≥ 1 ;

(C) a polyisocyanate compound; and

(D) an optional chain extender.

6. (Amended) The polymer gel electrolyte of [any one of claims 1 to 4]claim 1, wherein the matrix polymer is a polymeric material having an interpenetrating network structure or a semi-interpenetrating network structure.

8. (Amended) The polymer gel electrolyte of [any one of claims 1 to 4]claim 1, wherein the matrix polymer is a thermoplastic resin containing units of general formula (3) below



in which the letter r is an integer from 3 to 5, and the letter s is an integer ≥ 5 .

9. (Amended) The polymer gel electrolyte of [any one of claims 1 to 4]claim 1, wherein the matrix polymer is a fluoropolymer material.

10. (Amended) The polymer gel electrolyte of [any one of claims 1 to 9]claim 1, wherein the electrolyte salt is at least one selected from the group consisting of alkali metal salts,

quaternary ammonium salts, quaternary phosphonium salts and transition metal salts.

11. (Amended) A secondary cell comprising a positive electrode, a negative electrode and an electrolyte, wherein the electrolyte is a polymer gel electrolyte according to [any one of claims 1 to 10]claim 1.

14. (Amended) An electrical double-layer capacitor comprising a pair of polarizable electrodes and an electrolyte between the polarizable electrodes, wherein the electrolyte is a polymer gel electrolyte according to [any one of claims 1 to 10]claim 1.